DOCUMENT RESUME

ED 244 397 EA 016 853

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TITLE Organizational Behavior Change: The Effectiveness of Behavior Modification Techniques with and without Participatory Management.
PUB DATE Apr 84
NOTE 33p.; Paper presented at the Annual Meeting of the Eastern Psychological Association (Baltimore, MD, April 1984).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Behavior Modification; Case Studies; Change Strategies; *Employer Employee Relationship; Hospital Personnel; *Institutional Administration; Organizational Change; *Overtime; *Participative Decision Making; *Problem Solving; *Retrenchment; Staff Utilization

ABSTRACT

This study examines a naturally occurring experiment in a large urban hospital faced with budget cuts, in which departments were ordered to reduce employees' overtime without jeopardizing service quality. The study focuses on two departments that chose to use behavior modification techniques. In one department (Radiology) the intervention combined behavior modification techniques with participatory management, while the second (Emergency Room) used only behavior modification techniques. Both interventions focused on the behavior of supervisory staff responsible for assigning overtime. Analysis of the departments suggested that they were generally comparable in staffing and in demands for overtime use. An interrupted time-series analysis was employed to measure trends in overtime usage before and after the introduction of the interventions. Results indicate that a combination of participatory management and behavior modification techniques led to a more efficient reduction in overtime than did behavior modification techniques used alone. (Author/TE)

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Organizational Behavior Change: The Effectiveness of Behavior Modification Techniques with and without Participatory Management

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Paper presented at the Eastern Psychological Association Meeting

Baltimore, MD, April, 1984

EA 016 853

Abstract

The present study examined a naturally occurring experiment taking place in a large urban hospital faced with budget cuts. Departments were ordered to reduce employee overtime usage without jeopardizing service quality; the specific method of reduction was left to the department head. Our study focused on two departments which chose to use behavior modfication techniques. In one department (Radiology) the intervention combined behavior modification techniques with participatory management, while in the second (Emergency Room), only behavior modification techniques were used. Both interventions focused on the behavior of supervisory staff responsible for assigning overtime. Analysis of the departments suggested that they were generally comparable in staffing and in demands for overtime use.

An interrupted time series analysis was employed to measure trends in overtime usage before and after the introduction of the interventions. For the Emergency Room, this consisted of 52 weeks prior to and 54 weeks following the intervention; in radiology, the comparable figures were 52 weeks pre and 38 weeks post intervention. Results indicated that a combination of participatory management and behavior modification techniques led to a more efficient reduction in overtime than did behavior modification techniques used alone.

Organizational Behavior Change: The Effectiveness of Behavior Modification Techniques with and without Participatory Management

The present study examined organizational change efforts conducted within an urban hospital. Two intervention strategies were applied to the problem of reducing staff overime: behavior modification techniques used alone and behavior modification techniques combined with participatory management. Each strategy was used in a separate hospital department. The focus of the research was to assess the effectiveness of the two intervention strategies in reducing overtime.

The next section of this paper will outline the economic context that led to the particular interventions studied, the special problems in applying change interventions to human service organizations (HSOs) and some of the pertinent literature on behavioral and cognitive approaches to change.

Economic Considerations

Virtually all hospital facilities been affected by the recent turbulence in the economic climate. Years of inflation (particularly in medical costs) followed by cuts in governmental spending (as a means of controlling inflation!) have hurt most hospital and health care facilities (McLaughlin, 1982). Such cuts have had a particularly dramatic impact on federally funded health care programs, e.g., Medicare, Medicaid, National Health Service Corps. These cutbacks have negatively affected employment rates and local economies. The depressed economic

climate also affects the payment behavior of consumers, who pay more slowly (if at all) for hospital services they have received (McLaughlin, 1982). All of these factors have had a direct impact upon cash flows and monies available to hospitals. The shifting of costs from the public to private sector over a relatively short period of time has demanded that hospitals develop efficient management strategies in a cutback environment.

One reaction to the funding situation has been the demand by different organizations in the public sector to seek help from various government sources, philanthropic organizations, or other funding sources. The upsurge in demands for funds has forced such funding organizations to be more discriminating in their giving criteria (McLaughlin, 1982) and seek out efficient organizations. Thus, there is an additional pressure on health care facilities to demonstrate cost efficient operation and accountability.

The current administration's desire to transfer a greater burden of health costs to the private sector was intended both to reduce the current deficit as well as to stimulate competition in the marketplace. Unfortunately, the health care marketplace, as compared with most private sector industries, is subject to strict regulation and governmental policies that inhibit their potential to compete (Kohlman, 1981). For example, Medicare regulatons for reimbursement have previously been set up in a way that provided a disincentive for managerial efficiency. New regulations, e.g., the use of diagnostically related groups as

the payment basis in Medicare, have begun to reshape this tendency.

Taken together, these factors have caused hospitals to evaluate internal and external factors affecting the efficiency of their operation. Effectiveness in managerial approaches is imperative in order to provide accountability to the community served (McLaughlin, 1982) and to ensure cost efficient operation.

Organizational Development in Human Service Organizations

The economic forces described above are forcing many hospitals, as well as human service organizations (HSOs) in general, to consider radical changes in their operating environments to increase efficiency. Historically, HSOs have been criticized for their managerial deficiencies (McLaughlin, 1982), yet such invectives, while having some factual basis, largely reflect a lack of understanding of the unique dynamics of HSOs. The differences between HSOs and most private sector businesses are clearly exemplified in hospitals and health care centers.

Kouzes and Mico (1979) have characterized HSOs as "loosely" coupled organizations in contrast with most private sector enterprises which are "tightly" coupled. This means that the different levels of the organization often have different goals, constituencies and preferred methodologies for accomplishing their work. To illustrate, most hospitals consist of three separate domains of activity (Kouzes & Mico, 1979): a policy

domain, where governing policy is formed, a management domain, where policy is translated into day-to-day operation, and a service delivery domain, where professionals and other support staff perform the actual health care functions.

Each domain is characterized by its own unique rules, structural makeup, and measures of success. Table 1 illustates some of the operational differences of each domain.

Insert Table 1 about here

These domains operate largely as separate entities within the whole organization. Problems arise when one domain is perceived to transgress into the territory of another, e.g., medical staff object when decisions regarding operating procedures affect the way they choose to deliver medical care.

One consequence of the differences between HSOs and private sector organizations is that many of the organizational development strategies that have emerged from the private sector have been ineffective when directly applied in HSOs (Weisbord, 1976; Kouzes & Mico, 1979).

Behavioral Science and Motivation

The literature dealing with behavioral science applications to motivation has had two major themes: first, an internal motivational or cognitive approach, which is concerned with the

mental processes which affect behavior, and second, a behavioral approach, which is characterized by an emphasis on environmental cues to behavior. Cognitive approaches have been concerned with the role of expectations, attitudes, and needs on behavior. The behaviorist perspective draws upon Skinner's (1953) work with operant conditioning which focuses on the impact of specific environmental stimuli on learning.

Contemporary management theory has largely been dominated by theories reflecting a cognitive perspective. For instance, management has traditionally been well-versed in Maslow's (1943) hierarchy of needs and McGregor's (1960) Theory X and Y approach to organizational analysis. Maslow's theory reflects the cognitive approach in that he identified how various need states motivated individual behavior. McGregor's theory incorporates Maslow's notion of higher need states yet also attaches a high degree of importance to the environment as an influence on behavior. This emphasis on environmental factors is consistent with the work of Skinner, who saw the individual as being molded by his surroundings (Nord, 1969).

Other cognitive theories which have become popular in the management literature include those of Vroom (1964) and Locke (1968). Vroom's (1964) expectancy/valence theory stated that behavior is motivated by an individual's expectation that actions will result in desired outcomes. Locke (1968) strongly emphasized the importance of conscious goal-setting in motivating human actions and his theory became the cornerstone of Management

by Objective (MBO) programs. In a summary of research concerned with the effects of goal setting on behavior, Locke (1968) concluded that the more difficult a goal was to achieve, the greater the effort that would be expended to achieve it. That is, the individual's perception of goal difficulty dictates his actions. The perception of goal difficulty is based on the idea that man seeks to control his environment through cognitive processes (Branden, 1966). Studies assessing goal difficulty in relation to performance output confirm the notion that cognition dictates behavior(Dey & Xaur, 1965; Mace, 1935; Locke, 1968).

The notion of participatory management, a concept largely developed by Rensis Likert (1967), also reflects a cognitive orientation. Likert (1967) believed that such a system, which permits the expression of worker's needs and goals in the decision-making process, results in a more effective and satisfying work environment.

The key element of a behaviorist approach to behavior change is its concern with external environmental events and their relationship to behavior. One advantage to the external approach is that by limiting itself to observable stimuli, as opposed to speculating about internal factors such as need states or expectations, it lends itself readily to study by management. Organizational behavior modification (OB MOD) is the term Luthans and Kreitner (1975) used to describe behavior modification applications to organizational settings. In the OB MOD approach, behavior is contingent upon environmental factors, and not

cognitive reasoning processes.

The theoretical base of the behaviorist approach is the work of B.F. Skinner (1938). Skinner argued that learned behavior was the result of its consequences. Learning arose from either respondent or operant conditioning. Operant conditioning is significant as it is a response that "operates" on the environment. In other words, the response is a direct result of what it will cause, its consequences. The consequences act as reinforcement of desired behavior.

Prior to 1968, much of the behavioral science literature related to organizational behavior change reflected cognitive theories of motivation (Nord, 1969). A shift toward greater use of behavior modification approaches in business settings occurred during the late 1960's (Andrasik, 1979). One explanation for the lack of behavioral approaches prior to this time can be tied to Skinner and his research techniques. As suggested in one of the classic articles on behaviorist techniques in industry ("At Emery Air Freight", 1973) behavior modification has been unpopular because of:

> Skinner, his alleged totalitarian leanings, his denial of free will, and the inescapable fact, that his theory for human behavior is rooted in his experiments with pigeons. People seem to resent a theory that seems to suggest that they are not much brighter than pigeons and can be controlled in similar ways. (p. 50)

Despite this polemic, behavior modification techniques have been

shown to be effective in a variety of industrial settings (e.g., "Emory Air Freight", 1973; Komaki, Waddel, & Pearce (1977); Andrasik, 1979) as well as in HSO's (see Ayllon & Azrin, 1968; Pomerleau, P brove & Smith, 1973; Quilitch, 1975; Cooper, Thompson, & Baer, 1970; Van Houten & Sullivan, 1975).

The above research indicates that motivational theories with both internal and external focuses have been successful. Behavioral scientists have been split in their opinions as to which is more effective when applied in organizational settings (see Parmerlee and Schwank (1979) for their analysis of the Locke (1977, 1979) versus Grey (1979) debate over the application of behavior modification techniques).

Fedor and Ferris (1981) have argued that much of the cognitive-behavioral debate may be irrelevant, and that both cognitive and behaviorist methods can be effectively combined in developing effective organizational interventions. For example, Fedor and Ferris (1981) support employee participation in establishing OB MOD interventions. They note that participation has been demonstrated to aid in individual growth, job enrichment, and fostering employee involvement on the job. Moreover, they state that previous research using behavior modification applications in organizational settings has tended to down play the role of participation. The lack of research assessing the effects of OB MOD combined with a participatory factor has led to an unfortunate state in which "no truly eclectic approach has emerged to functionally integrate aspects

of OB MOD with the cognitive orientation of widely espoused management philosophies" (p. 116). The present research represents a first attempt to integrate these two perspectives by assessing the relative effectiveness of two OB MOD interventions, one utilizing participation, the other not.

Research Issues

This research assessed the time efficiency of two motivational interventions aimed at large scale organizational behavior change. Both interventions were intended to reduce overtime use within departments of a large urban hospital. In one department, the intervention used aspects of a cognitive motivational approach, participatory management, along with behavior modification techniques (PM/BMI), while in the second department, only a behavior modification intervention (BMI) was used. These interventions were designed to change the behavior of supervisory level personnel in regard to assigning overtime.

Hypotheses

The specific hypotheses examined were:

Hypothesis 1: A PM/BMI will cause reduction of overtime usage.

Hypothesis 2: A BMI will cause reduction of overtime usage.

Hypothesis 3: A PM/BMI will reduce overtime more rapidly than a BMI.

Methods

Due to the in vivo nature of the study, a quasi-experimental design was employed using an interrupted time-series analysis (Box & Jenkins, 1976). Overtime usage in both departments was measured prior to and following the intervention.

Time-series observations, in the form of continuous weekly overtime hourly reports, were provided by the Radiology (XRAY) and Emergency Room (ER) departments. The ER provided approximately two years of continuous data; 52 weeks pre and 54 weeks post intervention, while XRAY provided 90 weeks of continuous data; 52 weeks pre and 38 weeks postintervention. The preintervention overtime data had been described as a typical representation of OT usage over the last three years by the respective departmental chiefs.

In order to assess participation, the amount and type of reinforcement received, and obtain an accurate picture of the two departments prior to and during the intervention periods, structured interviews were conducted with key personnel from each department. This was necessary since the researcher had no control over the nature of the intervention or the schedule of reinforcement used. Interviews were conducted with all supervisors involved with scheduling overtime. Department chiefs were also interviewed as a potential check on the accuracy of the responses of the supervisors.

Description of the Environment

Department structure. This section will provide an overview of the two departments as well as description of the change methods used in each. Table 2 presents a summary of various demographic features of both departments.

Insert Table 2 about here

As suggested by the data in Table 2, both departments consisted of staff at various skill levels who were involved in stressful work. Compared with other hospital departments, both ER and XRAY had high overtime usage. Although not identical, it was felt that the two departments showed enough similarities to permit meaningful interpretation of differences arising form the different interventions applied.

Interviews were conducted in both departments with all line supervisors as well as the department chiefs. Each of those interviewed had been in the department for the entire time period studied.

The sixteen question survey gathered information on several issues. Respondents were asked about the causes of overtime as well as detailed information about the structure of the reduction interventions, i.e., environmental cues, feedback (positive and negative), reinforcement, and participation. A summary of this information for each department is presented here.

All supervisors reported similar reasons for overtim assignment, .e.g., sick time, vacation, personnel shortage, disaster or emergency situations. In addition, each department had some unique circumstances which contributed to the large OT use.

IN the ER there was not policy for assigning overtime. Typically, supervisors assigned overtime on a voluntary basis, with little effort to identify employees for whom the additional hours would not create an overtime situation. Moreover, not all ER personel, even within a given job classification, were qualified to work in all needed positions within that classification. Most supervisors stated that as a result of these limitations, the emphasis was in filling a position, not worrying about the possible OT consequences.

In XRAY, 24 hour qualified personnel was also a requirement. In addition, OT would often occur if a case was in progress and the attending technicians could not leave.

Another large contributor to OT within XRAY was a semi-annual job called "purging". Purging involved the physical removal of six months of x-rays from the radiology file room to a storage vault, a process that traditionally had taken three to five weeks. In past years it had not been unusual for the department to use 600 to 800 hours of OT for this project.

Finally, one of the more consistent OT abuses dealt with punching in and out at the time clock. Supervisors agreed that many staff in both departments tended to either punch in early, punch out late, or both, creating overtime situations.

The Interventions

The interventions in both departments focused on the line supervisory staff, since they were responsible for OT assignments. They are described below (see Sweeney, 1984 for a more complete description).

The ER chief devised the intervention method used in that department (BMI). She first assumed scheduling responsibilities for all staff. This left line supervisors with the task of assigning OT that had not been scheduled in advance. She drew up a chart listing the names of all employees, the positions they were qualified to fill, and whether they were full or part-time employees. She then began an "educatonal campaign", which focused on changing the process by which supervisors assigned OT.

This campaign was conducted through a series of staff meetings in which supervisors were taught the proper method for making OT assignments. Subsequently, all supervisor behavior regarding OT assignments was reinforced following a continuous reinforcment (Ferster & Skinner, 1957) schedule, i. e., all statements or actions that led to OT reduction were positively reinforced, while such actions that did not reduce OT use were negatively reinforced by the department chief.

The ER chief reported using negative and positive reinforcment regularly.

All line supervisors reported that these contacts impacted upon their behavior in a way that reduced OT. The major reason stated for this impact was that the issue of OT was in their minds, therefore making them more conscientious when assigning OT. The ER chief concured with this in stating that all supervisors eventually followed the procedure she outlined as a result of the seriousness she attached to the issue. Few ER supervisors reported their efforts as instrumental in the reduction effort, although their chief felt their efforts had had a very positive effect upon the success of the program.

The intervention used in XRAY was more complex since it involved a paricipatory management process. All supervisory staff partook in the intervention design.

The process consisted of three supervisory group meetings and an additional individual meeting between each supervisor and the XRAY chief. The first meeting introduced supervisors to the hospital OT reduction mandate, by providing background information regarding finances and budgetary restrictions. Supervisors were then asked to consider what could be done within their areas as well as department-wide to reduce OT. The second meeting was a brainstorming session in which ideas were integrated in a way that provided consistency across areas and prevented changes in one area from impacting negatively on another area. Plans were finalized defining exactly what would

occur at the intervention onset in the third meeting.

The plan basically consisted of staggering employee hours, stressing punching the time clock at the correct times, and preparing staff for the eventuality of having to work on some occasions short staffed. The plan was announced at a general staff meeting for all department employees. Later, section meetings were held by each line supervisor to further clarify upcoming changes, answer staff questions, and receive suggestions that would be considered if seen as a way of improving the plan.

Since XRAY's intervention coincided with a hospital-wide reduction effort, cues to change were readily evident in the environment. Some of these cues were provided by the hospital prior to the intervention. A letter describing the financial plight of the organization and the hospitals stated goal of a 40% reduction of OT during the first six months of the fiscal year, was sent to all employees via their paychecks. In addition, articles regarding efforts to cut costs appeared in the hospital newspaper in two issues preceding the start of the intervention.

Positive and negative reinforcment were used in XRAY along a fixed interval schedule. Verbal and written reinforcment occured at approximately the same time each week and month. Written feedback was positive and consisted of calculated results of OT reduction and a cue "keep up the good work". Verbal feedback was either positive or negative as was warranted by line supervisory behavior.

Interview data from XRAY revealed that most supervisors felt that their input was important in the development of the program, and all felt that their efforts were valuable in the actual reduction of OT usage. This is in contrast to the perceptions of ER supervisors and suggests that the participatory aspects of the intervention were successful.

Supervisors in both departments reported mixed reactions from staff regarding the OT policy. Many were unhappy with the loss of extra income. Interestingly, XRAY supervisors reported feeling a high degree of stress during the intervention period while ER supervisors reported no change in stress level.

Both departments felt that the reduction had been successful; ER supervisors all characterized the program as very successful, while XRAY supervisors rated it from somewhat to very successful. This may reflect the reported increase in stress in this department. The ER increased its use of part-time employees during its intervention while XRAY decreased the use of part-time employees. Both departments reported service delivery levels to be the same or higher from previous years.

Results

Time-series analysis was used on the overtime data to determine the relative efficiency of the two interventions. Time-series analysis is a statistical procedure which, when applied to a series of sequential observations, accounts for changes other than random error. In the present case, this

analysis permitted the separation of effects caused by the interventions from other variations in the data arising from random error, seasonal trends, etc. (Cook & Campbell, 1979).

The current study used the autoregressive, integrated, moving average (ARIMA) time-series model, based on the work of Box and Jenkins (1976). BMDP (Dixon, W. J., Brown, M. B., Engleman, L., Frane, J. W., Hill, M. A., Jennrich, R. I., & Toearek, J. D., 1983) statistical software was used for this analysis.

Basically, two types of changes were assessed, abrupt, which represents a significant and highly visible shift in the time-series data, and gradual, which represents a slower up or down drift in the data that demonstrates, ultimately, a significant departure from the time-series trend. Change was expected to appear, through analysis of the pre and post intervention time series of the two groups, that would be either immediate and statistically significant or gradual and statistically significant (McDowall, McLeary, Meidinger, & Hay, 1980). (The actual implementation of this analysis required the estimation of various statistical parameters from the overtime data. The reader is referred to Sweeney (1984) for a more complete discussion of this process).

Data Analysis

Two different ARIMA models were determined and applied to the weekly overtime data collected from the XRAY and ER departments. There were 106 weeks of data from the ER and 90 weeks from XRAY. A graph of these data, when inspected visually, indicated pronounced reductions in OT use in both departments (see Figure 1).

Insert Figure 1 about here

An ARIMA model of order (P,1; D,0;Q,1,10) was used on the ER data as it met the requirments for acceptance dictated by Bowerman and O'Connell (1979, p 396). The parameter estimates were statistically significant, with MA1= T(100)= -14.27, P<.001; MA 10= T(100)= 3.79, P<.001; AR1= T(100)= 18.25, P<.001. Only one parameter did <u>not</u> significantly aid in explaining the time-series process: the U polynomial, used for assessing abrupt change, was not significant, T (100)= -1.55, .1 < P < .2. The S polynomial, which assessed gradual effects, was significant, T (100)= 18.94, P<.001. This supports the hypothesis that significant behavior change occurred in the ER from the intervention and that the trend of this change can be described as a gradual reduction in OT use. The model accounted for all activity in the time-series except random error.

In XRAY the data were analyzed in a similar manner. The model chosen for the XRAY data was P=1, D=0, and Q=1,3. This model met the requirments for acceptance according to Bowerman

and O'Connell (1979, p. 396) and left only random error unaccounted for in the series. These parameters were significant: MA1= T(84)= 2.51, P<.05; MA3= T(84)= 4.39, P<.001; AR1= T(84)= 65.87, P<.001.

The S and U polynomials were added to this as well. The U (abrupt) polynomial was significant, T(84)= -4.40, P<.001, but the S polynomial was not, T(84)= -1.11, .2 < P <.5. This finding supports the hypotheses that (1) significant behavior change occurred in the Radiology Department following the introduction of the intervention, and (2) the patern of change was more dramatic (time efficient) in Radiology than in the Emergency Room.

In summary, the time-series analysis of these data sets yielded two ARIMA models that closely patterned the original data sets. Each part of the model accounted for some of the activity that actually occurred in the series of observations. Each department was assessed for two types (abrupt and gradual) of intervention impact. The difference between the departments occurred only in the component assessing the trend of the intervention impact (gradual versus abrupt); The XRAY department showed a more abrupt reduction in overtime use in comparison to the ER. These results substantiate all hypotheses of the study, i.e., that both interventions were effective in causing change and that the combination of participation with behavior modification techniques, used in XRAY, would prove to be more time efficient.

Discussion

Analysis of the overtime data indicated significant reduction in overtime usage took place in both the XRAY and the ER departmants. Both departments were subject to separate interventions and analyzed according to changes in OT usage following the interventions. Since the departments were compared against themselves, it would be difficult to say that a truly direct scientific comparison had been achieved. Yet there is evidence to confirm the major hypothesis of the research project.

First, the interview data documented the use of the described interventions in each department. The BMI applied in the ER established a gradual trend in reduced use of overtime hours, indicative of employee behavior change on a staff and supervisory level, that successfully solved on OT problem. The intervention fit into the theoretical framework of such a behavior modification classification. The fact that it was a naturally occuring phenomena in an applied setting gives greater credibility to the idea that use of behavior modification techniques for organizational change is tenable.

In XRAY, the PM/BMI resulted in a more immediate reduction in overtime hours used. This supported the hypothesis that PM/BMI would bring about behavior change more time efficiently than BMI. This component of the intervention was a blend of two theoretical orientations, internal sources of motivation and environmental cues to action, that are often diametrically opposed. Although the concept of applying participatory

managmant and behavior modification techniques has been proposed (Fedor & Ferris, 1981), the philosophical debate around these issues has stymied needed research. Besides illustrating the compatibility of the cognitive and behaviorist positions, this intervention also provides an example of a successful application of organizational behavior change research within a HSO despite the difficulties noted by Kouzes and Mico (1979).

There are a number of issues relating to the use of participatory management that might be investigated further. Stress was reported as being the same or higher in XRAY where PM was used. The increase might be attributed to demands placed on personnel subject to immediate change. It might also reflect the fact that supervisors could not "pass the buck" when talking with disgrunted workers regarding the source of the policy change since they were instrumental in its formation. Further work is needed to explore the stress issue and possible mitigating mechanisms, e.g., the development of social support structures. Indeed, one of the dilemmas facing HSOs is that interventions which increase economic viability at the cost of increased stress and, presumably, increased burnout among staff, is likely to have long-term negative consequences for the organization.

Another potential issue for research could be employees' perception of the ethicality of using behavior modification techniques in a work setting. It would be worthwhile to examine whether employees subject to PM/BMI tactics view the intervention more positively than those subject to BMI alone.

Finally, this study underscores the potential benefits of integrating cognitive and behaviorist methodologies in organizational change efforts. While this study must be considered a first step, it supports Fedor and Ferris' (1981) contention that further work is needed in developing a truly eclectic approach to behavioral change. The potential application of such methodologies, particularly in human service settings, remains an exciting and worthwhile challenge.

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Table 1

Characteristics of the Three Domains[1]

Dimension	Domain		
	Policy	Management	Service
Principals	Consent of the governed	Hierarchical control Coordination	Autonomy Self-regulation
Success measures	Equity	Cost efficiency Effectiveness	Quality of service
Structure	Representative Participative	Bureaucratic	Collegial
Work modes	Bargaining Negotiating	Use of linear techniques and tools	Client specific problem-solving

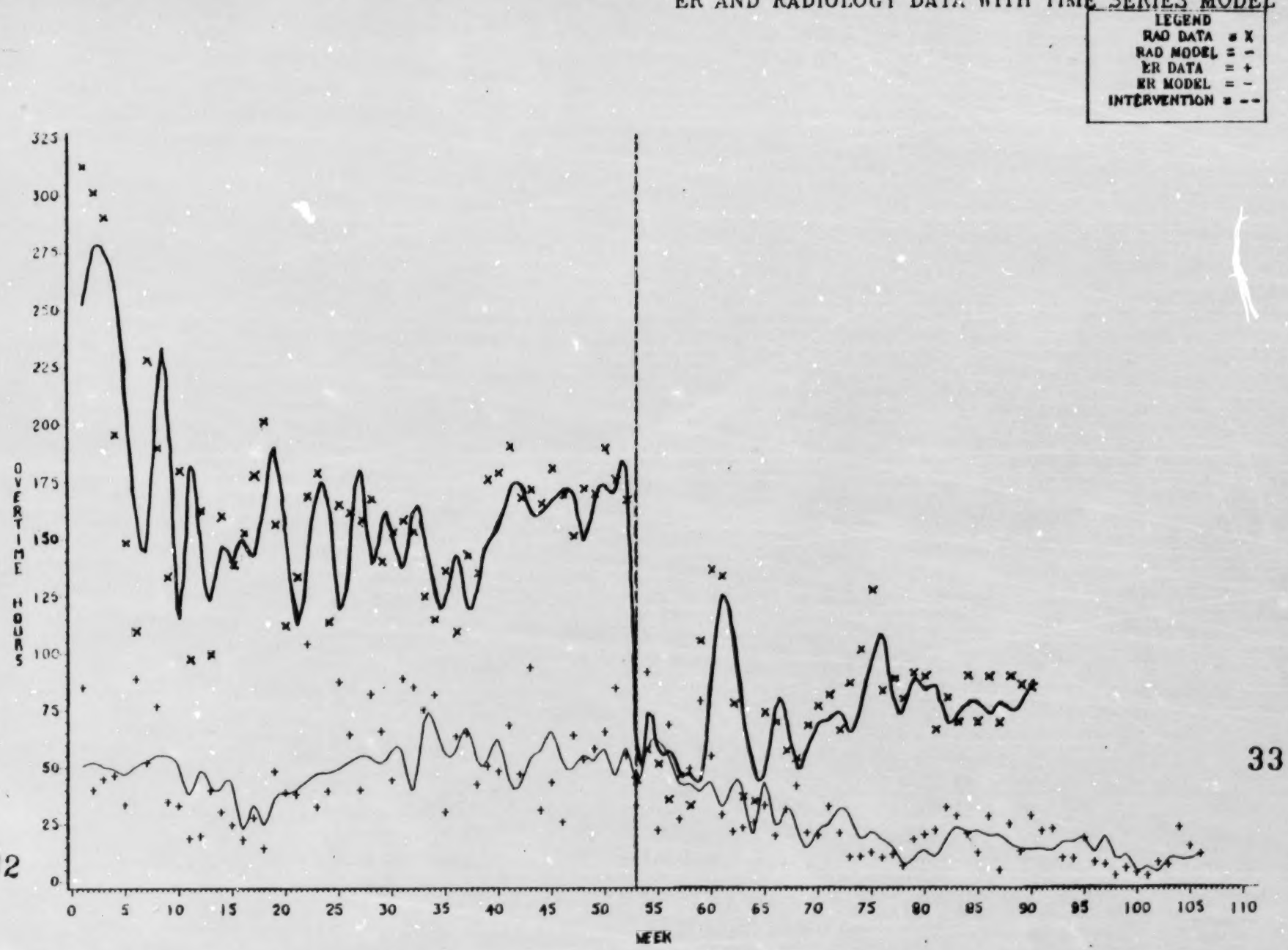
[1](adapted from Kouzes and Mico, 1979)

Table 2

Characteristics of the Radiology Department and the Emergency Room

Characteristic	Department XRAY	ER
1. Employment Status		
A. Part time	133	54
B. Full time	84	16
2. Worker classification		
A. Clerical	30%	40%
B. Aid	10%	30%
C. Assistant		30%
D. Technical	60%	
3. Number of Supervisors	5	4
4. Department chiefs	1	1
5. Specific departmental requirements		
A. 24 hour/7 day/week staffing	x	x
B. High volume work output	x	x
6. History of high overtime usage compared to other departments	x	x
7. Employee similarities		
A. Reported high stress in job	x	x
B. Report to one supervisor	x	x

ER AND RADIOLOGY DATA WITH TIME SERIES MODEL



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